

IN THE CLAIMS:

Claims 1-11 and 13-18 are cancelled.

Claim 12 is amended.

Claims 19-32 have been added.

1-11 (Canceled).

12. (Currently amended) A liquid cooling system for cooling heat generating components having one or more heat transfer units, the heat transfer unit comprising:

a first electron conducting material coupled to a power source;

a cold region of the electron conducting material thermally coupled to one or more heat generating components for absorbing heat from the heat generating components; and

a hot region of the electron conducting material for receiving heat from the cold region;  
and

a coolant pathway thermally coupled to the hot region for absorbing heat from the hot region into a coolant transported there through.

~~a heat transfer unit operating under the peltier effect, the heat transfer unit including a cold region and a hot region generating heat, wherein the cold region is capable of mating with a processor;~~

~~a conduit coupled to the hot region and dissipating heat by transporting cooled liquid, the cooled liquid transforming into heated liquid in response to receiving the heat from the hot region; and~~

~~a heat exchange unit coupled to the conduit and receiving the heated liquid, the heat exchange liquid generating the cooled in response to receiving the heated liquid.~~

13-18 (Canceled).

19. (New) The cooling system as set forth in claim 12, the heat transfer unit further comprising:

a second electron conducting material disposed in close proximity to the first electron conducting material where in the cold region of the second electron conducting material is adjacent to the cold region of the first electron conducting material and both cold regions are thermally coupled to the heat generating components; and

a second coolant pathway thermally coupled to the hot region of the second electron conducting material for absorbing heat from the hot region of the second electron conducting material into a coolant transported there through.

20. (New) The cooling system as set forth in claim 19 further comprising:

a heat exchange unit for receiving heated coolant from the heat transfer unit, cooling the heated coolant, and directing cooled coolant to the heat transfer unit.

21. (New) The cooling system as set forth in claim 20 further comprising:

an inlet of the heat transfer unit coupled to the coolant pathways for receiving cooled coolant from the heat exchange unit and directing the cooled coolant to the coolant pathways;

an outlet of the heat transfer unit coupled to the coolant pathways for receiving heated coolant from the coolant pathways and directing the heated coolant to the heat exchange unit; and

where in the inlet is disposed below the outlet for enhancing convective flow of the coolant.

22. (New) The cooling system as set forth in claim 19 having N heat transfer units as described in claim 19 interleaved with and in close proximity to N, N-1 or N+1 heat generating components wherein heat from each such component is absorbed by the cold regions of the first and second electron conducting materials of all heat transfer units to interleaved with such component and wherein N is an integer greater than 1.

23. (New) The cooling system as set forth in claim 22 further comprising one or more heat exchange units for receiving heated coolant from the transfer units, cooling the heated coolant, and directing cooled coolant to the heat transfer units

24. (New) The cooling system as set forth in claim 23 further comprising:

one or more inlets of the heat transfer units coupled to the coolant pathways for receiving cooled coolant from the heat exchange unit and directing the cooled coolant to the coolant pathways means;

one or more outlets of the heat transfer units coupled to the coolant pathways for receiving heated coolant from the coolant pathways means and directing the heated coolant to the heat exchange units; and

wherein the inlets are disposed below the outlets for enhancing convective flow of the coolant.

25. (New) The cooling system of claim 12 where in the electron conducting material is embedded in the substrate of a semiconductor material.

26. (New) The cooling system of claim 12 where in the electron conducting material is a solid state, peltier-effect device.

27. (New) An electronic system having the cooling system as set forth in claim 12.

28. (New) A mobile electronic system having the cooling system as set forth in claim 12.

29. (New) A portable electronic system having the cooling system as set forth in claim 12.

30. (New) A system with optical devices having the cooling system as set forth in claim 12.

31. (New) A method for cooling heat generating components in an electronic system comprising the steps of:

- applying power to an electron conducting device;
- absorbing heat from the heat generating components by thermally coupling the cold region of the electron conducting device to the heat generating component; and
- absorbing heat from the hot region of the electron conducting device by thermally coupling a coolant pathway to the hot region whereby heat is absorbed from the hot region into a coolant transported through the coolant pathway.

32. (New) The cooling system as set forth in claim 12, the heat transfer unit further comprising:

- a second electron conducting material disposed in close proximity to the first electron conducting material;
- a cold region of the second electron conducting material thermally coupled to one or more heat generating components for receiving heat from the heat generating components;
- a hot region of the second electron conducting material for receiving heat from the cold region of the second electron conducting material and disposed in close proximity to the hot region of the first electron conducting material; and
- where in the coolant pathway is thermally coupled to the hot regions of the first and second electron conducting materials for absorbing heat from the hot regions into a coolant transported there through.